UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA

REGENTS OF THE UNIVERSITY OF MINNESOTA, Plaintiff, v. AGA MEDICAL CORPORATION, Defendant.	Case No. 07-CV-4732 (PJS/RLE) *MARKMAN* ORDER

Kevin D. Conneely, David D. Axtell, Ruth Rivard, and Erik M. Drange, LEONARD, STREET AND DEINARD, PA; Mark B. Rotenberg and Tracy M. Smith, UNIVERSITY OF MINNESOTA, OFFICE OF THE GENERAL COUNSEL, for plaintiff.

J. Derek Vandenburgh, Alan G. Carlson, R.J. Zayed, Tara C. Norgard, and Andrew M. Mason, CARLSON, CASPERS, VANDENBURGH & LINDQUIST, P.A., for defendant.

This matter is before the Court for construction of certain terms found in the claims of U.S. Patent No. 6,077,281 (the '281 patent) and U.S. Patent No. 6,077,291 (the '291 patent) in accordance with *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 390-91 (1996). The parties prepared an amended joint claim-construction statement ("JCCS"), and each side submitted two briefs (opening and response) on claim-construction issues. The Court held a *Markman* hearing on April 17, 2009.

I. BACKGROUND

Plaintiff Regents of the University of Minnesota ("the University") brings suit against defendant AGA Medical Corp. ("AGA") for infringement of the '281 and '291 patents. Both patents cover medical devices for repairing heart defects. The University owns the patents,

which are part of a family of four patents covering inventions made by Gladwin S. Das. The University prosecuted all four patents as Das's assignee.

The Das patents descend from an application filed in 1992. The University abandoned the original application, but subsequent divisional applications resulted in four patents: U.S. Patent No. 5,334,217, issued in April 1994; U.S. Patent No. 5,578,045, issued in November 1996; and the '281 and '291 patents, both of which were issued on June 20, 2000. These four patents include different claims but generally share the same specification.[1]

Further, during prosecution of both the '281 and '291 patents, the University agreed to file a terminal disclaimer with respect to each patent. JA 206;[2] JA 437. Terminal disclaimers are a means of overcoming a rejection based on "non-statutory double patenting," a doctrine under which a continuation patent can be held to be obvious (and therefore invalid) in light of a related patent that issued earlier from the same application as the continuation patent. *See Geneva Pharms., Inc. v. GlaxoSmithKline PLC*, 349 F.3d 1373, 1377-78 (Fed. Cir. 2003). By means of a terminal disclaimer, the patentee gives up ("disclaims") any portion of the continuation patent's term that exceeds the term of the related patent. *Id.;* 37 C.F.R. § 1.130; Manual of Pat. Exam. Proc. § 718.

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[1]The abstract of one patent, U.S. Patent No. 5,578,045, differs from the abstract of the other patents. The claims of patent 5,578,045 cover a delivery system for implanting a device for repairing heart defects, not the device itself.

[2]The parties filed a joint appendix containing materials relevant to claim construction [Docket No. 70]. Each page in the joint appendix has a page number beginning with the prefix "APP-." The Court cites these materials as "JA [page number]"; thus, for instance, "JA 204" corresponds to the page numbered "APP-00204."

The Court thanks the parties for cooperating with each other in preparing the joint appendix and for helpfully organizing it.

A terminal disclaimer is, in essence, a concession by the patentee that two patents that resulted from the same application should be treated as a single patent, effective for a single patent term. Put differently, the claims of the continuation patent are treated as if they appeared in the first patent. In this case, as the result of terminal disclaimers, the '281 and '291 patents expire at the same time as U.S. Patent No. 5,334,217.

Roughly speaking, the Das patents cover a closure device for repairing a hole between two chambers of a human heart. The closure device is delivered through a catheter that is threaded through a vein or artery until the catheter's far end reaches the chamber of the heart featuring the hole to be closed.

The closure device features two disks that are joined at the center. The disks, which are springy, are folded up and pushed through a catheter. The far end of the catheter is placed through the hole in the heart. The device is then pushed forward through the catheter until the first of the two disks comes out of the catheter on the far side of the hole and springs back into its disk-like shape. The catheter is then pulled back to the near side of the hole with the second half of the device (i.e., the second disk) still inside the catheter. The device is pushed forward again until the second disk springs out, this time on the near side of the hole. The area where the two disks are joined blocks the hole, and the disks stay in position for two reasons: (1) they are bigger than the hole, and (2) they are springy. The central portion of the disk eventually becomes solid in one of a number of ways, and at that point, the hole is closed.

This description is, of course, oversimplified. The devil is in the device's details, which are precisely the focus of the parties' claim-construction arguments. The Court addresses those arguments below as it construes the disputed terms of the '281 and '291 patents.

II. GENERAL PRINCIPLES

Courts, not juries, construe patent claims. *Markman*, 517 U.S. at 391. Language in a particular claim must be construed in the context of both that individual claim and the entire patent, including the specification. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc). Indeed, the specification, read in light of the prosecution history, is the primary basis for construing patent claims. *Id.* at 1315. Generally, the prosecution history of each patent in a family of patents is relevant to construing the claims of all patents in that family. *See, e.g.*, *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282, 1293 (Fed. Cir. 2005) ("Because [the] patents all derive from the same parent application and share many common terms, we must interpret the claims consistently across all asserted patents.").

Courts may also rely on "extrinsic evidence" — anything other than the patent and its prosecution history — but that evidence is secondary to the intrinsic evidence. *Phillips*, 415 F.3d at 1317. In general, claim language means whatever it would have meant, ordinarily and customarily, to a person of ordinary skill in the art at the time the patent application was filed. *Id.* at 1312-13. In some cases, the ordinary and customary meaning of claim language to a person of ordinary skill in the art may be identical to the meaning that the language would have to a lay person who is not skilled in the art. *Id.* at 1314.

III. CLAIM CONSTRUCTION

The parties have not argued that someone of ordinary skill in the art would interpret any of the disputed language differently than would an educated lay person. Instead, the parties' arguments have focused on the '281 and '291 patents themselves, the prosecution history, and definitions from both general-purpose and technical dictionaries. Further, AGA agreed at the

Markman hearing that its arguments did not depend on the definition of a person of ordinary skill in the art. Hr'g. Tr. at 10-11 [Docket No. 108]. And the University generally asks the Court either not to construe the disputed terms at all, or to construe them according to their ordinary meaning. Am. JCCS Sched. B [Docket No. 64]. The Court therefore construes the terms as would an ordinary educated layperson who had access to technical dictionaries.

A. Term 1: "affixed," "joined," and "connected"

The parties have agreed to treat the terms "affixed," "joined," and "connected" as essentially synonymous and have identified these terms, taken together, as the first disputed term to be construed. Am. JCCS Sched. B at 1. For the reasons given below, the Court does not believe that these terms need to be construed; instead, the Court construes the claims of the '291 patent as follows:

> The phrase "first and second occluding disks" means "physically distinct and separate first and second occluding disks." The phrase "first and second disks" means "physically distinct and separate first and second disks."

All of the claims of the '291 patent relate to a device with "first and second occluding disks" or "first and second disks." Independent claims 1, 24, and 30 are device claims drawn to a device with "first and second occluding disks." Independent claim 17 is a method claim that includes the step of "selecting a closure device comprising first and second occluding disks." And independent claim 28 is a method claim that includes the step of "providing a closure device

comprising first and second disks."[3] The remaining claims depend from one of these five independent claims and thus include the limitations found in the independent claims.

Different claims use different terms to describe the relationship between the first and second disks. Some claims use forms of the word "affix"; others use forms of the word "join"; others use forms of the word "connect"; and some use more than one of these words.[4] Specifically (relevant words italicized):

> According to claim 1, "each disk compris[es] a . . . membrane," and "a central portion of the membrane of the first disk [is] *affixed to* a central portion of the membrane of the second disk to define a conjoint disk . . . ."
>
> Claim 4 refers to "the *affixed* central portions of the membranes," which "define a generally circular conjoint disk."
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> Claim 17 says that "a portion of the structure of the first disk [is] *joined to* a portion of the structure of the second disk by a *joining* segment . . . ."
>
> Claim 23 says that "a central portion of the flexible structure of the first disk [is] *affixed* directly to a central portion of the flexible structure of the second disk to define said conjoint disk . . . ."

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[3]Claim 28, as originally proposed, referred to "a closure device comprising first and second occluding disks," as does claim 17. JA 376. Claim 28 was later amended and the word "occluding" was stricken. JA 418. Neither the patentee nor the examiner specifically discussed this amendment.

[4]Some claims more precisely describe the relationship between the two disks. Claim 2 provides that "the central portions of the membranes are *bonded directly to* one another to define the conjoint disk." Claim 5 provides that "the central portions of the first and second membranes are *sewn together* to define the conjoint disk." Claim 6 provides that "the central portions of the first and second membranes are *fixed* to one another *by a biologically compatible adhesive*."

These particular terms — "bonded," "sewn," "fixed" by adhesive — are not in dispute. But they support the Court's claim construction because they all suggest that the two disks are physically distinct things that must somehow be joined to one another.

> Claim 24 says that "a portion of the membrane of the first disk [is] *joined* to a central portion of the membrane of the second disk," and then refers to "the *affixed* central portions of the first and second disks."
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> Claim 25 refers to "the *joined* central portions of the first and second disks," which "comprises [*sic*] a conjoint disk."
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> Claim 28 says that "a portion of the first disk [is] *connected to* a portion of the second disk by a tubular segment . . . ."
>
> Claim 30 says that "a central portion of the membrane of the first disk [is] *affixed to* a central portion of the membrane of the second disk by a tubular segment . . . ."

The Court agrees with the parties that variations on the words "affix," "join," and "connect" are used interchangeably throughout the claims of the '291 patent. Claim 24 makes this particularly clear: The claim first says that membranes are "joined" and then describes the membranes as being "affixed."

The Court also agrees with the University that these words are ordinary English words, used in their ordinary sense, and therefore do not need to be construed. *See* Univ. Opening Br. at 15-16 [Docket No. 68]. The essence of AGA's argument, however, is not that the words themselves are unclear and need to be construed. Rather, AGA argues that these words carry a clear implication that should be made explicit.

AGA proposes making this implication clear by construing "being affixed to," "being joined to," and "being connected to" to mean: "Two physically discrete and separate disks are physically connected to one another." Am. JCCS Sched. B at 1; AGA Opening Br. at 18 [Docket No. 65]. Such a construction is, of course, impossible: "being affixed" and the like are present-participial phrases functioning as adjectives, and an adjective cannot be construed as a sentence

any more than it can be construed as a noun.[5] Further, AGA has failed to explain why the ordinary English words "affixed," "joined," and "connected" as used in the '291 patent are so unclear that the Court should construe them.

But AGA's central point — that the '291 patent covers a device with physically separate disks, and that this property of physical separateness is entailed by the patent's use of the words "affix," "join," and "connect" — is well taken. To begin with, this fact of separateness follows from the ordinary meaning of these words — the very meaning that the University ascribes to them. Univ. Opening Br. at 15-16. Specifically, the third edition of the *American Heritage Dictionary* ("*AHD Third*") defines "join" to mean "[t]o put or bring together so as to make continuous or form a unit: *join two boards with nails; joined hands in a circle*." *American Heritage Dictionary of the English Language* 971 (3d ed. 1996). A supplemental note following *AHD Third*'s entry for "join" says:

> SYNONYMS: *join, combine, unite, link, connect, relate, associate.* These verbs mean to fasten or affix or become fastened or affixed. *Join* applies to the physical contact, connection, or union of at least two separate things and to the coming together of persons, as into a group . . . . *Combine* suggests the mixing or merging of components . . . . *Unite* stresses the coherence or oneness of the persons or things joined . . . . *Link* and *connect* imply a firm attachment in which individual components nevertheless retain their identities . . . .

Id. Similarly, the note on synonyms following the entry for "join" in *Webster's Third New International Dictionary* ("*Webster's Third*") says:

> Although they are used to signify a more specific union, *link*, *connect*, *join*, and *conjoin* in their nonphysical application may

[5]For instance, "happy" (adjective) cannot be construed to mean "joy" (a noun) or "a person is smiling" (a sentence).

> suggest a bringing or coming together as general and unspecified as that implied by *relate* or *associate* but tend more, esp[ecially] in physical application, to signify a junction of some kind, often an inseparable junction as by a chain or by bonding. *Connect* is the most general of these four and suggests a loose attachment, esp[ecially] one that preserves the identity of the elements and the evidence of the connection . . . . *Link* suggests a slightly closer coupling esp[ecially] in the physical application of the word in which is implied inseparability but of still clearly identifiably separate elements . . . . *Join* usu[ally] suggests strongly the idea of physical or moral contact or junction or the making of a continuity of two or more things . . . .

Webster's Third New International Dictionary 1219 (1981).[6]

As these passages from two major unabridged dictionaries make plain, one does not ordinarily speak of the parts of a unitary structure as being "affixed" or "joined" or "connected" to each other.[7] Consider a block of marble: No one would say that the left half of the block of marble is "affixed" to the right half. And if a statue was carved out of the block of marble, no one would say that the top half of the statute was "affixed" to the bottom half. Conceivably, one might say that the two halves were "connected"; but the parties have agreed to treat "affixed" and "connected" as synonyms, and things that are "affixed" are, by that word's necessary implications, originally separate.

Further, the specification and the prosecution history uniformly support construing the '291 patent to cover only a device in which two physically distinct and separate disks are connected to one another. For one thing, the abstract refers to "a *pair* of occluding disks, *each*

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[6]In *Webster's Third*, the words under discussion in this passage (link, connect, join, etc.) are set in small capital letters. The Court has used italics instead.

[7]Although the parties cite various contemporary dictionaries in their briefs and in the Amended JCCS, the Court deliberately cites dictionaries that predate the issuance of the patents-in-suit.

disk being formed" in a particular way, which implies that the disks are separate (consider "a pair of shoes" or "a pair of aces"). '291 patent abstract (emphasis added). And every single embodiment disclosed in the '291 patent's drawings and its written description is made up of two separate disks.

Further, the "Summary of the Invention" describes the device as "includ[ing] first and second occluding disks which are *attached* to one another." '291 patent col. 3:8-9 (emphasis added). The word "attached" functions here as a synonym for the words "affixed," "joined," and "connected" in the claims. And the word "attach" — like the words "join," "affix," and "connect" — means to connect physically distinct things.[8] *See also Dentsply Int'l, Inc. v. Hu-Friedy Mfg. Co.*, 202 Fed. Appx. 464, 467-68 (Fed. Cir. 2006) (nonprecedential) (upholding claim construction of a "tip" as an "attachment" — that is, as a "separate attachment").

The Court's claim construction is also supported by the use of the term "conjoint disk" throughout the '291 patent. The specification uniformly describes the "conjoint disk" as something that results from bringing together the first and second disks. *See, e.g.*, '291 patent col. 3:17-20 ("The affixed central portions of the two membranes define[] a central 'conjoint disk' of the device . . . .").

Finally, both the domestic and foreign prosecution history of patents related to the '291 patent indicate that the terms "joined," "affixed," and "connected" have their ordinary meaning, a

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[8] *See Webster's Third* 140 ("attach . . . 5: make fast or join (as by string or glue)"); *id.* ("attachable . . . 2a: capable of being fastened or added to something"); *id.* ("attachment . . . 3: a device that is attached (as to a machine) esp[ecially] for doing special work . . . 4: the physical connection by which one thing is attached to another"); *AHD Third* 118 ("attach . . . 1. To fasten, secure, or join. 2. To connect as an adjunct or associated condition or part. . . . 3. To affix or append; add"); *id.* ("attachment . . . 2. Something, such as a tie, band, or fastener, that attaches one thing to another. . . . 4. A supplementary part or accessory.").

meaning which entails that the things being "joined," "affixed," or "connected" are physically distinct and separate things. In pursuing the first patent application in this family — application 07/822,951 — the University said: "A septal defect closure device of the invention utilizes two disks which are each formed of a membrane and a frame. . . . [A]pplicant attaches the membranes of the two disks essentially directly to one another . . . ." JA 976. In referring to "two disks" that "each" had the same components and that were attached "to one another," the University was plainly describing a device made by bringing together two similar, separate, physically distinct disks.

Further, in connection with an application to the European Patent Office for a patent on a device like the one covered by the patents-in-suit, the University distinguished its claimed invention from a Russian device by saying:

> [The Russian device] has flanges . . . made in one piece with a *tubular* part . . . . Each flange is equipped with a resilient element . . . . This arrangement certainly does not comprise two disks with a central portion of a first disk being affixed to a central portion of the second disk as required in the main Claim [of the University's application].

Vandenburgh Decl. [Docket No. 66] Ex. 8 at AGA_PROD084893-94 (emphasis in original). This particular piece of extrinsic evidence, standing alone, would not be dispositive, because the Russian device being distinguished in the quoted passage differs in *two* ways from the patentee's device: The Russian device is *both* tubular *and* made in one piece. But the University emphasized — as it did in prosecuting the patents in suit — the "two disks" that make up the University's patented device.

In short, a person of ordinary skill in the art (or, for that matter, anyone of ordinary skill in the English language) would read the '291 patent as covering only a device made up of two

physically separate disks that are attached to one another. The University admits that the words "joined," "affixed," and "attached" should be given their ordinary meaning. The University must therefore also accept that those words carry their ordinary implications, particularly since nothing in the '291 patent or its prosecution history suggests otherwise. It follows that the "first and second" disks referred to in the '291 patent's claims must be physically distinct and separate disks.

B. Term 2: "in communication with"

The Court construes the term "in communication with" in claims 1 and 2 of the '281 patent as follows:

> A portion of a first member is "in communication with" a portion of a second member if those two portions are cavities or tubes whose interior spaces are connected to each other by means of an opening or passageway.

Claim 1 of the '281 patent covers a device with two "members" and requires that "at least a substantial portion of the central portion[s]" of the two members be "in communication with" each other. Claim 2 of the '281 patent depends from claim 1 and covers a device with "disks in communication with one another [that] are attached to one another to define a conjoint disk."

The University contends that "in communication with" means "interconnected with." Am. JCCS Sched. B at 5; Univ. Opening Br. at 22-23. But at oral argument, the University conceded that, as far as this case is concerned, "interconnected" is no different from "connected." Hr'g Tr. at 57. Thus, the University contends that "in communication" as used in the '281 patent is synonymous with the terms "joined," "affixed," and "connected" discussed above. *Id.*

AGA likewise treats "in communication with" as basically synonymous with "joined," "affixed," and "connected." As it does with respect to the latter three terms, AGA asks the Court

to substitute a complete sentence for a word or phrase that functions as an adjective. According to AGA, "in communication with" means: "The first and second members must be physically discrete and separate components; these physically discrete and separate components must be attached to and in contact with each other over a substantial portion of the respective central portion of each member." Am. JCCS Sched. B. at 5; AGA Opening Br. at 19.

AGA's proposed construction wrongly transforms a simple prepositional phrase into a series of statements larded with factual assertions that relate tangentially (at best) to the claim language to be construed. The University's proposed construction is also unhelpful, although it is at least more sensible than AGA's in form. The University's construction also prompts the question: If "in communication with" just means "connected to," why doesn't the patent just say "connected to"?

The likely answer is that the lawyer who drafted this claim thought (or hoped) that "in communication with" was broader than "connected to." The '281 patent is the last patent to descend from patent application number 07/822,951 filed in 1992. Earlier patents in the same family generally cover "disks" whose central portions are "affixed" to each other. *See, e.g.,* '291 patent claim 1; U.S. Pat. No. 5,334,217 claim 1. But in claim 1 of the '281 patent, the drafter substituted the vague term "member" for the clearer term "disk," in an obvious attempt to claim the patented invention more broadly than earlier patents did.[9]

[9]Notably, in claim 2 of the '281 patent, the drafter forgot to carry out his project of broadening the claim language. Claim 2 covers "[t]he device of claim 1, wherein the portions of *the disks* in communication with one another are attached to one another to define a conjoint disk." '281 patent claim 2 (emphasis added). But claim 1 does not (as it did in earlier patents in this family) refer to "disks"; it refers to "members."

But the word "communication," when used to denote a physical relationship, has a very particular meaning. The relevant definition of "communicate" in *AHD Third* is "[t]o be connected: *apartments that communicate*." *AHD Third* 383. The relevant definition of "communicate" in *Webster's Third* is "to be connected: open into each other: afford unbroken passage: *join* <the two rooms [communicate]> <the pantry [communicates] with the hall>." *Webster's Third* 460. These definitions, and the examples they provide, establish two things about the physical relationship of "communication." First, things that communicate physically must have an interior space, as do cavities (such as rooms) or tubes (such as hallways). Second, physical communication involves connecting those interior spaces to one another.

The University relies on the definition of "communicate" in *Webster's Third* to support its contention that "in communication with" means "interconnected with." Am. JCCS Sched. B. at 7; Univ. Opening Br. at 23. But the University has not explained why the Court should look only at the first portion of the definition ("to be connected") and ignore the remainder ("open into each other: afford unbroken passage").

A patentee can, of course, be his own lexicographer. *Phillips*, 415 F.3d at 1316 ("[T]he specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs."). But the '281 patent contains nothing to suggest that the word "communication" in claim 1 means something out of the ordinary. To the contrary, the specification of the '281 patent uses a form of the word "communication" twice, and both times the word seems to carry its ordinary meaning.

First, in describing the purpose of the claimed invention, the '281 patent says that "the instant closure device can be used to treat ventricular septal defects, patent ductus arteriosus[,] or any other congenital or acquired orificial or tubular *communications* between vascular chambers or vessels." '281 patent col. 18:1-4 (emphasis added). An "orificial . . . communication[]" between chambers or vessels is obviously a hole; a "tubular communication[]" is obviously a tube or passageway. Thus, "communications" has its ordinary meaning here. In particular, the "communications" described in the quoted portion of the '281 patent are connections between cavities ("vascular chambers") or tubes ("vessels"), and those cavities or tubes are in communication with each other because an opening or passageway connects their interiors.

Second, in describing a delivery system for the claimed closure device, the '281 patent says that a "chamber 216 must extend through the distal end 211 of the housing to define a distal port 219 therein . . . to permit *communication* of the control means 230 with the catheter C." '281 patent col. 13:63-66 (emphasis added). From Figures 13 and 14 of the '281 patent, it is apparent that a catheter — a hollow tube — is connected by means of an intermediate tubular part to a hollow chamber that contains the "control means" referred to in this sentence. Thus, the catheter and the chamber that houses the control means "communicate" with one another in a conventional sense. The control means itself does not, strictly speaking, "communicate" with the catheter; rather, the control means is connected to a part (a "tubular urging member," '281 patent col. 15:16) that rides *within* the catheter. But because the control means is connected to a part within the catheter's interior, the control means does, in a loose sense, "communicate" with the catheter.

In light of this intrinsic evidence about how the words "communication" and "communications" are used in the '281 patent, the Court construes the term "in communication with" in claims 1 and 2 according to its ordinary meaning. Whether this construction covers the disclosed embodiments is beside the point, because no other construction is reasonable in light of the evidence. *See Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357 (Fed. Cir. 1999) ("[A] nonsensical result does not require the court to redraft the claims of the . . . patent. Rather, where . . . claims are susceptible to only one reasonable interpretation and that interpretation results in a nonsensical construction of the claim as a whole, the claim must be invalidated . . . .").

C. Terms 3 and 4: "tautly holding"

The Court construes the term "tautly holding" in claim 1 of the '291 patent and in claim 1 of the '281 patent as follows:

> The term "tautly holding" derives from the phrase "to hold tautly." "To hold something tautly against a septum" means both (1) to hold that thing itself taut, like a drum head, and (2) to hold that thing tightly against a septum.

This construction follows from the ordinary meaning of the word "taut" and from the intrinsic evidence.

The relevant language of claim 1 of the '291 patent covers

> first and second occluding disks, each disk comprising a flexible, biologically compatible membrane capable of being collapsed for passage through a catheter and elastically returning to a predetermined shape *for tautly holding* a portion of the membrane against a septum . . . .

'291 patent claim 1 (emphasis added).

The relevant language of claim 1 of the '281 patent covers

> a first member and a second member each comprising a self-expanding structure exhibiting a spring-like behavioural component for moving the member between a compressed orientation for passage through a medical instrument having an inner diameter and an expanded orientation having an enlarged diameter *for tautly holding* at least a portion of the closure device against a septum . . . .

'281 patent claim 1 (emphasis added).

The two claims are largely parallel. Where the '291 patent has first and second "disks," the '281 patent has first and second "members"; where the '291 patent has "comprising a . . . membrane," the '281 patent has "comprising a . . . structure"; and where the '291 patent has "a portion of the membrane," the '281 patent has "at least a portion of the closure device." Both claims specify that *something* is "for tautly holding" something else ("a portion of the membrane" or "at least a portion of the closure device") against a septum.

In excerpting the relevant claim language in the amended JCCS, the parties decided to treat the phrase "tautly holding," minus the preposition "for," as if it modified "membrane" in the '291 patent and "member" in the '281 patent. Am. JCCS Sched. B at 8, 11. They did not explain how they reached this decision, and the Court finds it to be unsupportable. To begin with, omitting "for" is unjustifiable: A "steak for cooking" is not the same thing as a "steak cooking." The claim contains the prepositional phrase "for tautly holding," which is different from the phrase "tautly holding." The Court must construe the claim as it is written.

The prepositional phrase "for tautly holding" could function as either an adjective (by modifying some noun phrase) or as an adverb (by modifying some verb phrase). *See* Rodney Huddleston & Geoffrey K. Pullum, *Cambridge Grammar of the English Language* ("*Cambridge Grammar*") 612, 656 (2002); Randolph Quirk et al., *A Comprehensive Grammar of the English*

Language 657 (1985). Thus, in the sentence "I own boots for walking," the prepositional phrase "for walking" modifies the immediately preceding noun "boots" and functions as an adjective. But in the sentence "I bought those boots for walking," the prepositional phrase "for walking" modifies "bought" and thus functions adverbially.[10]

In claim 1 of the '291 patent, the phrase "for tautly holding" could modify the noun "shape," which immediately precedes "for tautly holding." Although prepositional phrases that serve as adjectives generally modify the immediately preceding noun, "shape for tautly holding" is implausible, since the closure device's shape, as such, does nothing. More plausibly, "for tautly holding" is intended to modify either the activity of "being collapsed . . . and elastically returning," or the elastic property demonstrated by that activity. Thus, the relevant portion of claim 1 of the '291 patent could be paraphrased this way:

> The device comprises two disks with elastic properties. By virtue of these elastic properties, the disks can be collapsed for passage through a catheter and will return to their predetermined shapes when they exit the catheter for deployment on the two sides of a septum. These elastic properties will cause part of the disks — when deployed in their expanded, predetermined shapes — to be held tautly against the septum.

In claim 1 of the '281 patent, the phrase "for tautly holding" could modify the immediately preceding noun "diameter." But "diameter for tautly holding" is as implausible as "shape for tautly holding," and for a similar reason: A "diameter," as such, does not do anything; a diameter is just a measurement. But the other possible readings — "orientation . . . for tautly

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[10]Modern grammarians use relatively unfamiliar terminology to describe how prepositional phrases relate to other parts of speech and to clauses. *See Cambridge Grammar* 646 (describing prepositions functioning as "complement," "adjunct," and "modifier"). The Court uses simpler terminology that is likely more familiar to readers who are not trained in linguistics.

holding," "behavioural component . . . for tautly holding," "member . . . for tautly holding — are equally unsatisfactory. In short, claim 1 of the '281 patent is, from a syntactic standpoint, even more poorly formed than claim 1 of the '291 patent.

Yet the *gist* of claim 1 of the '281 patent, and of the "tautly holding" claim language, is clear enough. Claim 1 of the '281 patent, like claim 1 of the '291 patent, covers a spring-like structure that is compressed during delivery and then expands upon deployment. After the structure is expanded, its springiness causes it to be tautly held against the septum in which it is deployed. The Court need not parse the unparseable language of claim 1 to be able to construe the phrase "tautly holding" and to resolve the parties' dispute over that phrase.

The Court agrees with AGA that for a structure to be tautly held against a septum, the structure itself must be taut, *and* the structure must be held tightly against the septum. *See* Am. JCCS Sched. B. at 11; AGA Opening Br. at25-26. Further, the Court agrees with the University that "taut" has its ordinary meaning in the '281 and '291 patents. Univ. Opening Br. at 25-26. That said, though, the Court finds that most — though not all — of AGA's proposed claim construction follows from the ordinary meaning of the word "taut."

The relevant definition of "taut" in *Webster's Third* is "tightly drawn: tensely stretched: not slack <the flesh seemed smoothed back, even painfully [taut] —R.P. Warren> <a piece of strong fabric about one yard square, kept [taut] by a wooden frame —H.W. Dowdesell>." *Webster's Third* 2344.[11] As the second illustration in this definition shows, a central instance of something "taut" is a thin sheet under tension across its surface, such as a drum head. This

[11]The relevant definition of "taut" in *AHD Third* is: "[p]ulled or drawn tight; not slack." *AHD Third* 1839. This is entirely consistent with the definition in *Webster's Third*, but is less informative.

meaning of "taut" fits naturally with the invention disclosed in the '281 and '291 patents — an invention featuring disks (or "members") that spring into shape when they are deployed.

Indeed, the word "taut" is used repeatedly in the specification in its ordinary sense. In particular, the specification says that, in an embodiment in which membranes are attached to frames, the frames "hold the membranes tautly and in intimate contact with the outer surface of the septum." '291 patent col. 10:19-21.[12] The Court therefore construes "tautly holding" consistently with the specification and with the ordinary meaning of the word "taut," and illustrates the phrase's meaning for laypersons with the easily understood example of a drum head.

The Court's construction of "tautly holding" differs from AGA's in only two material respects. First, in AGA's proposed constructions of the disputed terms (as the parties formulate those terms), AGA identifies the thing that is doing the holding as the "membrane" in the '291 patent and the "member" in the '281 patent. Am. JCCS Sched. B at 8, 11; AGA Opening Br. at 25-26. The University objects to this aspect of AGA's proposed construction. Univ. Opening Br. at 26-27. For the reasons already given, the Court does not find it either possible or necessary to identify precisely what holds the disks or members taut.

Second, under AGA's proposed claim construction, "*all* slack" must be removed from whatever is being held tautly. Am. JCCS Sched. B at 8, 11 (emphasis added). Although something "taut" necessarily has little or no slack, tautness is a question of degree. The '281 and

[12]*See also* '291 patent col. 5:6-14 (describing a preferred embodiment in which a frame "around the periphery of the membrane" serves, "in its natural, non-deformed state, . . . to hold the membrane . . . taut. . . . Normally, the frames . . . of the device pull their respective membranes . . . into a taut, generally planar shape . . . .").

‘291 patents use the phrase “tautly holding,” not “holding somewhat tautly” or “holding extremely tautly” or “holding absolutely tautly.” But AGA’s proposed construction would, in effect, transform “tautly holding” into “holding absolutely tautly.” Whether something is “held tautly” is a question of fact for the jury. Whether something is “held absolutely tautly” is a different question — one that the disputed claim language does not raise.

D. Term 5: “a self-expanding structure exhibiting a spring-like behavioural component for moving the member between a compressed orientation . . . and an expanded orientation”

The Court construes the term “a self-expanding structure exhibiting a spring-like behavioural component for moving the member between a compressed orientation . . . and an expanded orientation” in claim 1 of the ‘281 patent to be a means-plus-function limitation subject to 35 U.S.C. § 112, ¶ 6. The claimed function and the structure that corresponds to this function are as follows:

> The claimed function is moving the member from a compressed orientation to an expanded orientation. The structure that performs this function must be either: (1) a flexible, elastically deformable frame carried around the periphery of the member; or (2) a frameless membrane made of a thin piece of a superelastic material.

The disputed language is not written in means-plus-function format, and the University denies that it is a means-plus-function limitation. Am. JCCS Sched. B. at 14; Univ. Opening Br. at 27-31. Because the claim does not use the term “means,” the Court must presume as an initial matter that the University is correct and that § 112, ¶ 6 does not apply. *See Apex Inc. v. Raritan Computer, Inc.*, 325 F.3d 1364, 1371-72 (Fed. Cir. 2003). For the Court to construe the disputed language as a means-plus-function limitation, AGA must show, by a preponderance of the

evidence, that the claim does not recite sufficiently definite structure for performing the claimed function. *See id.* at 1372. AGA has made this showing.

To begin with, the patent claims a "structure" that has certain properties. The word "structure" is entirely generic. According to the University, however, "structure" as used in claim 1 of the '281 patent is made definite by the surrounding words that modify "structure." Univ Opening Br. at 30-31. Specifically, the University calls the Court's attention to the word "self-expanding" and the phrase "exhibiting a spring-like behavioral component." *Id.* at 31.

The University has not, however, made any attempt to establish that "a self-expanding structure exhibiting a spring-like behavioural component" is something with an understood meaning in the art. Instead, the University has told the Court what this disputed language does *not* do — it "does not call out a specific separate spring or tension spring . . . ." Univ. Opening Br. at 30. This is true, but unhelpful. The question before the Court is not what the term does *not* mean. Rather, the question is whether the disputed language, "as the name for the structure, has a reasonably well understood meaning in the art . . . ." *Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1583 (Fed. Cir. 1996); *see also Apex Inc.*, 325 F.3d at 1372 (quoting *Greenberg*). The Court finds that it does not.

To call a generic structure "self-expanding" is to describe what it *does*, not what it *is*. The word "self-expanding" thus does not make the claimed "structure" less generic. Similarly, to describe the structure as "exhibiting a spring-like behavioural component" is to describe — oddly and awkwardly, but plainly enough — how the structure behaves, not what it is.

The word "component" is no more particular than the word "structure." And to call a component "behavioural" is bizarre, since "components" are generally physical things, and

"behavioural" typically modifies abstract nouns (as in "behavioral psychology"). The phrase "behavioural component" thus cannot be interpreted to cover any structure with a meaning in the art (particularly since the University has offered neither evidence nor argument that "behavioural component" denotes any identifiable structure). Rather, the phrase "exhibiting a spring-like behavioural component" can be interpreted only one way: to mean something like "behaving like a spring." A "self-expanding structure that behaves like a spring" is thus a generic structure with spring-like properties, not a specific structure with a well-understood meaning.

Having determined that the disputed language is a means-plus-function limitation, the Court must next determine what function is claimed, and what particular structures are disclosed in the written description and linked to that function. *See Asyst Techs., Inc. v. Empak, Inc.*, 268 F.3d 1364, 1369 (Fed. Cir. 2001). It is obvious from the patent's written description that the claimed device expands by virtue of its spring-like properties but must be compressed by some external force. The Court therefore finds that the claimed function is moving the device "from" a compressed orientation to an expanded orientation, rather than moving the device "between" the two orientations. AGA agrees with this characterization of the claimed function. AGA Opening Br. at 28-29 & 28 n.11. And although the University proposed, in the amended JCCS, that the Court construe the claimed function to be "moving the structure between" the two orientations, Am. JCCS Sched. B at 14, the Court does not believe that the University actually objects to characterizing the function as involving movement only from a compressed orientation to an expanded one.

Having identified the claimed function, the Court must next ''identify the corresponding structure set forth in the written description that performs the particular function set forth in the

claim.'' *Asyst Techs.*, 268 F.3d at 1369. The ''corresponding structure'' must be clearly linked or associated, in the specification or prosecution history, with the claimed function. *B. Braun Med., Inc. v. Abbott Labs.*, 124 F.3d 1419, 1424 (Fed. Cir.1997).

The Court agrees with the University that the written description discloses two structures that can fulfill the claimed function of moving the member from a compressed orientation to an expanded orientation. There is no dispute that the written description discloses a device featuring a peripheral frame. Univ. Opening Br. at 33-34; AGA Opening Br. at 33-34. The only question is whether the written description also adequately discloses a frameless structure capable of moving the member from a compressed to an expanded orientation. The Court finds that it does.

In describing a preferred embodiment of the claimed invention, the patent describes a closure device with two disks, each featuring a membrane. '281 patent col. 4:58-61. The patent notes that the membrane "may be formed of a thin piece of superelastic material, such as a thin sheet of [nickel-titanium] alloy or a superelastic polymeric composite." *Id.* col. 5:3-6. The patent then describes a membrane with an attached peripheral frame that "in its natural, non-deformed state . . . serves to hold the membrane . . . taut." *Id.* col. 5:9-10. And the patent explains that the frame can "be deformed sufficiently for insertion into and passage through a small-diameter catheter yet automatically elastically return to its initial shape upon exiting the catheter." *Id.* col. 7:9-11. Crucially, after describing a membrane-plus-frame combination, the patent says: "[I]f the membranes are themselves formed of a superelastic material, they will tend to return to their original shape without a frame, so *the frame may be omitted* if so desired." *Id.* col. 5:32-35 (emphasis added).

In short, the peripheral frame is linked to the function of moving the disk (or, more generally, member) from a compressed to an expanded orientation. The patent unambiguously says that the frame may be omitted if the membranes are made of superelastic materials. And such superelastic membranes are described as "tend[ing] to return to their original shape" — that is, tending to return to an expanded orientation from a compressed orientation. This suffices to link a frameless, superelastic membrane to the claimed function.[13]

E. Term 6: "occluding"

The Court construes the term "occluding" in claim 1 of the '291 patent to mean "blocking or obstructing."

The core of the parties' dispute over this term is whether "to occlude" means "to block *completely*" or instead means "to block partially *or* completely." *See* AGA Opening Br. at 37-38; Univ. Opening Br. at 35-37. AGA contends that the "occluding disk" identified in claim 1 of the '291 patent must be "sufficiently impermeable to stop the flow of blood through a defect within an acceptably short period of time." Am. JCCS Sched. B at 19. This is a lot to pack into a single word, and AGA has not provided any evidence that a person of ordinary skill in the art would construe "occluding" to mean, in effect, "totally occluding." Instead, AGA supports its proposed

[13]Further, if the specification left any doubt that a frameless, superelastic membrane could move itself from a compressed to an expanded orientation, that doubt would be dispelled by the prosecution history of the '291 patent. During prosecution of that patent, the patentee responded to a rejection by the PTO by saying: "The omission of a frame is clearly contemplated in the specification of this application as originally filed." JA 414. The PTO subsequently allowed claims of the '291 patent that do not include the limitation of a peripheral frame. *Cf.* '291 patent claim 1 (no frame mentioned), *with* claim 7 ("The closure device of claim 1 wherein each of the first and second disks has a periphery, each disk further comprising an elastically deformable frame . . . .").

construction with evidence that "occluding" is used in the specification interchangeably with "closing" or "closure." AGA Opening Br. at 37-38.

This is true as far as it goes.[14] And it is also true that the purpose of the claimed invention is to stop completely — though not immediately — the flow of blood. *See* '291 patent col. 10:8-11. But it does not follow that "occlude" necessarily means "occlude completely," any more than "close" necessarily means "close completely." Put another way, a closure device that blocks *most* of the blood flowing through a defect is obviously less effective than one that blocks *all* of the blood. But a leaky plug is a plug nonetheless. And there is no reason, in the abstract, why a device could not both infringe a patent and be less effective for its purpose than other embodiments of the patented invention. The '291 patent itself therefore does not establish that "occlude" means "occlude completely."

Perhaps to a person of skill in the art, "occlude" in fact means "occlude completely." But neither AGA nor the University has presented any testimony from either doctors or medical-device inventors about how they use the word "occlude." The only evidence — apart from the specification, which is inconclusive — about the meaning of "occlude" comes from dictionaries cited by the University. Univ. Opening Br. at 35-36. Those dictionaries, along with other dictionaries consulted by the Court, do not establish that "occlude" means "occlude

[14]*See* '291 patent col. 1:11-16 ("The present invention generally relates to devices and methods for *occluding* septal defects . . . . In particular, the present invention provides a device for *closing* such defects . . . and a method for delivering and deploying that device to *close off* the defect.") (emphasis added); *id.* col. 1:45-50 ("[A]n *occluding* device is delivered through a catheter. Once the *closure* device is positioned adjacent the defect, it must be attached to the rest of the septum in a manner which permits it to effectively *block* the passage of blood through the defect.") (emphasis added).

completely."[15] The evidence, such as it is, thus supports construing "occluding" to mean "blocking or obstructing," as proposed by the University.[16]

F. Term 7: "membrane"

The Court construes the term "membrane" in claim 1 of the '291 patent to mean "a thin sheet or layer of material."

The word "membrane" is an ordinary word, and it is used in the '291 patent in its ordinary sense. For instance, in describing one embodiment, the patent says:

> [T]he membrane is preferably formed of a thin, flexible material, such as a fabric which may be folded and pulled taut without being damaged. Elastic polymeric materials such as nylon, polyester, polypropylene, polytetrafluoroethylene (Teflon), and expanded polytetrafluoroethylene (GoreTex), as well as natural fabrics such as silk, have been found to work quite well, with elastic nylon appearing to be the best material for the present purposes. Alternatively, the membrane may be formed of a thin piece of a superelastic material, such as a thin sheet of [nickel-titanium] alloy or a superelastic polymeric composite.

'291 patent col. 4:60 to col. 5:4. In describing a second embodiment, the patent says:

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[15]*See* Webster's Third 1560 ("occlude. . . 1: to shut or stop up so as to prevent the passage of something: *close*, *obstruct* <a thrombus *occluding* a coronary artery> <an *occluded* bronchus> <sank ships to *occlude* the harbor>"); *AHD Third* 1250 ("occlude . . . 1. To cause to become closed; obstruct; *occlude an artery*. 2. To prevent the passage of: *occlude light*; *occlude the flow of blood*"); *id.* 1251 ("occlusion . . . 2. *Medicine*. An obstruction or a closure of a passageway or vessel."); *Stedman's Medical Dictionary* 1250 (27th ed. 2000) ("occlude . . . 1. To close or bring together."); *id.* ("occlusion . . . 1. The act of closing or the state of being closed."); *Mosby's Medical, Nursing, & Allied Health Dictionary* 1135 (5th ed. 1998) ("occlusion . . . 1. (in anatomy) a blockage in a canal, vessel, or passage of the body"); *id.* ("occluded . . . closed, plugged, or obstructed").

[16]The University actually proposes to construe "occluding" to mean "blocking or obstructing blood flow through a septal defect." Am. JCCS Sched. B at 19. But given that claim 1 of the '291 patent is already directed to a "septal defect closure device," the Court sees no reason to state, in its claim construction, the obvious fact that the device occludes blood flow through a septal defect.

> [T]he membrane . . . of the present invention is not a single layer of fabric, but rather is a flexible, collapsible balloon-type member which can be inflated to define an internal cavity . . . . The membranes . . . may be formed of any suitable material, such as a thin, flexible latex or the like.

Id. col. 8:46-53.

The University asks the Court to construe "membrane" to mean "a relatively thin material." Am. JCCS Sched. B at 21. The Court believes that the University's proposed construction does not differ meaningfully from the construction adopted by the Court. The Court declines to describe the membrane as "relatively thin" because "relatively" confuses, rather than clarifies, the disputed term's meaning (relative to what?). And the Court describes the membrane as a "sheet or layer" of material, rather than simply "material," because the Court agrees with AGA that a wire could be called a "thin material" even though a wire is plainly not a "membrane."[17]

But the Court rejects AGA's contention that the "membrane" referred to in claim 1 of the '291 patent must be "sufficiently impermeable to stop the flow of blood through a defect within an acceptably short period of time." Am. JCCS Sched. B at 21. The function of the claimed invention is, of course, to stop blood flow across a heart defect. But not every limitation in a patent claim incorporates the claimed invention's purpose. Put another way, there is no more

[17]*See* AGA Opening Br. at 39; *Webster's Third* 1408 ("membrane . . . 1: a thin soft pliable sheet or layer esp[ecially] of animal or vegetable origin"); *AHD Third* at 1125 ("membrane . . . 1. *Biology*. a. A thin, pliable layer of tissue covering surfaces or separating or connecting regions, structures, or organs of an animal or a plant. b. Cell membrane. . . . 3. *Chemistry*. A thin sheet of natural or synthetic material that is permeable to substances in solution.").

reason to construe "membrane" in claim 1 to mean "membrane that stops the flow of blood" than there is to construe "disk" in claim 1 to mean "disk that stops the flow of blood."

To the extent that a term in claim 1 of the '291 patent could be construed to reflect the function of the claimed device, that term is "occluding," not "membrane." As described above, AGA asked the Court to construe "occluding" to mean "sufficiently impermeable to stop the flow of blood through the defect within an acceptably short period of time." Am. JCCS Sched. B at 19. Although the Court rejected AGA's proposed construction of "occluding" for the reasons already given, AGA's attempt to narrow the claim language to reflect the invention's purpose was at least reasonable in connection with "occluding."

AGA's attempt to narrow "membrane," however, is not reasonable. After all, the patent expressly says that the membrane in the preferred embodiment is "formed of a relatively porous material." '291 patent col. 10:5-6. In such an embodiment, blood flow is blocked not by the membrane alone, but rather because "blood will tend to coagulate in the conjoint disk after it has been in place for some time . . . ." *Id.* col. 10:8-10. In short, nothing in the '291 patent dictates giving the ordinary word "membrane" the extraordinary meaning proposed by AGA.

G. Term 8: "elastically return to a predetermined shape"

The Court finds that it need not construe either the phrase "elastically return to a predetermined shape" in claims 17 and 28 of the '291 patent, or the related phrase "elastically returning to a predetermined shape" in claim 1 of the '291 patent.

AGA and the University have two distinct disagreements with respect to this claim language. First, they disagree about the meaning of "predetermined shape." According to AGA, "predetermined shape" means "a shape that is determined prior to placement of the device in the

catheter." Am. JCCS Sched. B at 24. But a "predetermined" shape is necessarily a shape determined in the past, and thus AGA's proposed construction, at first glance, seems to add nothing to the claim language. A jury will be able to determine whether, once an accused device is deployed in a human body, that device returns to a shape that was determined beforehand — i.e., a predetermined shape.

Both the University and AGA, however, seem to interpret AGA's proposed construction as imposing some kind of exactness requirement. In other words, the parties seem to believe that, if AGA's proposed construction were adopted, it would require the "predetermined shape" to be a shape that is determined with great precision before the device is deployed. *See* Univ. Opening Br. at 41; AGA Opening Br. at 43-44. The Court doubts that AGA's proposed construction of "predetermined shape" would in fact impose an exactness requirement. More importantly, though, the patent does not support imposing such a requirement. The patent covers a device made of flexible materials, to be deployed inside a human heart. It is obvious to a layman that the device's two disks, when deployed, will have to conform to nearby human tissue and will not be ideal, Platonic circles. Because AGA's proposed construction either does nothing at all (on the Court's interpretation) or imposes an exactness requirement not supported by the patent (on the parties' interpretation), the Court rejects AGA's proposed construction.

AGA and the University also disagree, with respect to claim 1 only, about what portion of the device must "elastically return" to the predetermined shape. According to AGA, the device's "membrane" itself must exert a force to return to a predetermined shape. AGA Opening Br. at 42. That is, AGA contends that claim 1 covers only a device made with a membrane that is

itself elastic, and not a device made with, say, a non-elastic cloth membrane attached to an elastic frame.

The Court agrees with AGA that the thing in claim 1 that elastically returns to a predetermined shape is indeed the membrane. The relevant claim language covers a "disk comprising a . . . membrane capable of being collapsed for passage through a catheter and elastically returning to a predetermined shape . . . ." '291 patent claim 1. The words "capable of" modify "membrane," and the phrases "being collapsed" and "elastically returning" are parallel. Thus, it is the "membrane" in claim 1 that is "capable of being collapsed . . . and [capable of] elastically returning . . . ."

It is not obvious from the language of claim 1, however, that a membrane that is "capable of . . . elastically returning" to a shape must be a membrane that is capable of elastically returning to a shape *itself* — that is, without any "help" from a frame or other external force — as AGA would have it. One could say that a membrane "elastically returns" to a shape when the membrane is part of a structure that, as a whole, "elastically returns" to a shape. Suppose, for instance, that a small child is part of a family that is traveling by car across the country, and the child's father is doing all of the driving. It would be natural to say that the child is "driving cross-country," even though only the father is actually "driving," and even though the child is an infant.

In light of the '291 patent's specification, the Court finds that claim 1 of the '291 patent requires a membrane that elastically returns to a predetermined shape *either* through its own force *or* through some external force. The preferred embodiment that is discussed at greatest length in the '291 patent is a device with a spring-like external frame and a fabric-type

membrane. *See* '291 patent col. 4:56 to col. 8:40. In such a device, the elasticity may (depending on the membrane) come from the frame, and not from the membrane (which might be made of "silk" or another inelastic fabric, '291 patent col. 4:60-67). Because the '291 patent is so clearly intended to cover a device with an elastic frame and an inelastic membrane, the Court rejects AGA's proposed construction of the phrase "elastically returning."

H. Term 9: "conjoint disk"

The Court finds that it need not construe the term "conjoint disk" in claims 1 and 23 of the '291 patent.

AGA contends that a "conjoint disk" is "[a] specific structural element of the closure device that is defined by the area where the central portions of the membranes of two physically discrete and separate disks overlap and have been attached to one another." Am. JCCS Sched. B at 29. In effect, AGA is trying to insert within "conjoint disk" the same "physically discrete and separate disks" requirement that it advocated in connection with the terms "affixed," "joined," "connected," and "in communication with." *See* Am. JCCS Sched. B at 1.

The Court has already decided that the device claimed in the '291 patent must have "physically distinct and separate" disks. The Court reached this decision in part based on how the phrase "conjoint disk" is used throughout the patent. But the Court does not believe that the term "conjoint disk" itself needs to be further construed.

Although the word "conjoint" is unusual, the phrase "conjoint disk" is used in such a way in the patent that its meaning will be sufficiently clear to a jury. Claim 1 says that central portions of two disks are "affixed" to each other "to define a conjoint disk." This conjoint disk is obviously just the disk that results from joining the central portions of the two disks. Similarly,

Claim 23 says that a conjoint disk is "define[d]" when "a central portion of the flexible structure" of one disk is "affixed directly to a central portion of the flexible structure" of a second disk. The Court cannot define "conjoint disk" more clearly than the claims themselves.

I. Term 10: "substantially fill the defect"

The Court construes the term "substantially fill the defect" in claim 17 of the '291 patent as follows:

> A joining segment "substantially fills a defect" if the perimeter of the joining segment is substantially the same size as the perimeter of the defect.

Put simply, the parties' dispute over this term amounts to a disagreement over whether a hollow plug can fill a hole in the heart. AGA contends that claim 17 of the '291 patent requires a "joining segment" that "substantially fills" a defect by virtue of the segment's having "a physical cross-sectional area substantially equal to the cross-sectional area of the defect in order to stop the flow of blood through the defect." Am. JCCS Sched. B at 31-32. The University contends that this construction is too narrow. Univ. Opening Br. at 44.

The Court agrees with the University. The specification of the '291 patent discloses two very different embodiments of the patented device. In one embodiment, two flat disks are attached at their centers, and the resulting "conjoint disk" fills the defect to be closed. *See* '291 patent figs. 3-11. This device would be covered by claim 17 if the Court adopted AGA's proposed construction of the term "substantially fill the defect." The conjoint disk in this embodiment is flat and solid — that is, it has a "cross-sectional area" roughly equal in size to the defect in which the conjoint disk is located.

In a second embodiment, however, the "joining segment" is hollow and results from the concentric assembly of two cylindrical projections at the center of the two disks. *See* '291 patent fig. 12; *see also id.* claim 9 (claiming "[t]he closure device of claim 1 wherein the conjoint disk comprises a tubular segment"). Further, in this embodiment — which the Court will call the "balloon-type" embodiment — blood flow through the defect is not necessarily stopped by the joining segment alone (as would be required by AGA's proposed construction), but rather could be stopped because the hollow joining segment is attached on either side to membranes, and the membranes block the flow of blood. '291 patent col. 9:42-49. The joining segment and the attached membranes can also be filled with a liquid that then hardens to block blood flow. *Id.* col. 9:35-41. But in the balloon-type embodiment, the joining segment itself — whether or not later filled with liquid — is hollow. The joining segment does not have a "cross-sectional area" equal to the area of the defect, nor does the joining segment itself "stop the flow of blood through the defect."

The '291 patent clearly discloses the balloon-type embodiment, and clearly identifies the hollow segment at the center of that embodiment as a "tubular segment" that "is desirably sized to substantially fill the defect being blocked . . . ." '291 patent col. 9:16-19. In effect, in the balloon-type embodiment, the joining segment is like a hollow plug. And there is nothing unusual about saying that a hollow plug "fills" a hole. Under the circumstances, the Court construes the phrase "substantially fill the defect" to cover both preferred embodiments disclosed in the specification. *See, e.g.*, *Primos, Inc. v. Hunter's Specialties, Inc.*, 451 F.3d 841, 848 (Fed. Cir. 2006) ("[W]e . . . should not normally interpret a claim term to exclude a preferred embodiment.").

J. Terms 11 and 12: "automatically . . . positioning"

The Court finds that it need not construe the term "automatically . . . positioning" in claims 17 and 28 of the '291 patent.

These are ordinary words, used in their ordinary sense. Anyone who reads the patent claims will understand that the claimed device's central portion is positioned automatically — that is, without any further action on the part of the person implanting the device — within the defect when the device is fully deployed. Further, as both the University and AGA conceded at oral argument, anyone who reads the patent claims will understand that "automatically positioning" modifies "opening of the second disk" in both claims. Hr'g Tr. at 237-38, 243-45. That is, there is no dispute that the *thing* that "automatically positions" the "joining segment" (in claim 17) or the "tubular member" (in claim 28) is the "opening of the second disk" — i.e., the full deployment of the device.

AGA contended in the amended JCCS that for the second disk to automatically position the joining segment or tubular member within the defect, the opening of the second disk must "cause[]" the segment or member to "assume its position" within the defect.[18] Am. JCCS Sched. B at 36. In other words, AGA contended that the device's central portion cannot be in its final position — even by happenstance — before the second disk is opened; rather, the opening

[18]In discussing this term at oral argument, AGA's counsel seemed to contend that opening of the second disk must cause the disk's central portion to assume a "final" position within the defect. Hr. Tr. at 234-35. The Court rejects this argument for the reasons given in the text.

of the second disk must cause the central portion to move from a location that is not its final position to a location that is its final position.[19]

The Court rejects AGA's proposed construction because it is inconsistent with the words "automatically positioning" and the patent as a whole. It is clear from the specification and the patent claims that the device's central portion will already be at least roughly — and perhaps even exactly — in place within the defect after the first half of the device has been deployed on the defect's far side and before the second half has been deployed on the defect's near side. Yet even if, as a result of the accuracy of the deployment of the first half of the device, the device's central portion does not move *at all* when the second half of the device is deployed, the opening of the second half would nevertheless "automatically position" the device within the defect. That is, the opening of the second half would position the device within the defect without any further intervention.[20]

In such a situation, the "automatic position" assumed by the device's central portion would, by happenstance, equal the position that the device's central portion occupied before the second half of the device was deployed. But this happenstance would not change the fact that the

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[19]The Court is not sure whether AGA still advocates this construction given the University's concession that "opening of the second disk" is what "automatically position[s]" the joining segment within the defect. *See* Hr'g Tr. at 244-45.

[20]*See Webster's Third* 148 ("automatic . . . 3: having a self-acting or self-regulating mechanism that performs a required act at a predetermined point in an operation . . . 4: marked by spontaneous or apparently spontaneous action: marked by action that is unpremeditated and that arises as a really or apparently necessary reaction to or consequence of a given set of circumstances"); *id.* ("automatically . . . in an automatic manner: without thought or conscious intention"); *AHD Third* at 125 ("automatic . . . 1.a. Acting or operating in a manner essentially independent of external influence or control: *an automatic light switch; a budget deficit that caused automatic spending cuts.* b. Self-regulating: *an automatic washing machine*.").

opening of the device's second half positioned the device's central portion automatically. The Court finds that a jury will understand this without the need for any construction by the Court of the term "automatically . . . positioning."

K. Term 12: "tubular member"

The Court construes the term "tubular member" in claim 28 of the '291 patent to mean "tubular segment."

As AGA points out, subsection (a) of claim 28 of the '291 patent refers to a "tubular *segment*" that connects two disks, while subsection (e) says that "the tubular *member*" is positioned "in close proximity" to a periphery of the defect. AGA Opening Br. at 49-50. Use of "member" rather than "segment" in subsection (e) is an obvious and easily correctable drafting error. AGA's argument to the contrary — that "tubular member" is so unclear that it renders the claim indefinite — cannot be taken seriously. The Court therefore construes claim 28 to correct the drafting error. *See, e.g., Energizer Holdings v. ITC*, 435 F.3d 1366, 1371 (Fed. Cir. 2006) ("[A]n antecedent basis can be present by implication.").

IV. CONCLUSION

In light of the specifications (including the claims) of the '281 and '291 patents, the purposes of the claimed inventions as disclosed in all of the intrinsic evidence, the prosecution history, the ordinary meaning of the claim language, relevant extrinsic evidence, and the parties' arguments, the Court construes the disputed claim language as stated above.

Dated: September 29, 2009

s/Patrick J. Schiltz
Patrick J. Schiltz
United States District Judge